



STRUCTURAL FOAM

February 3, 2026

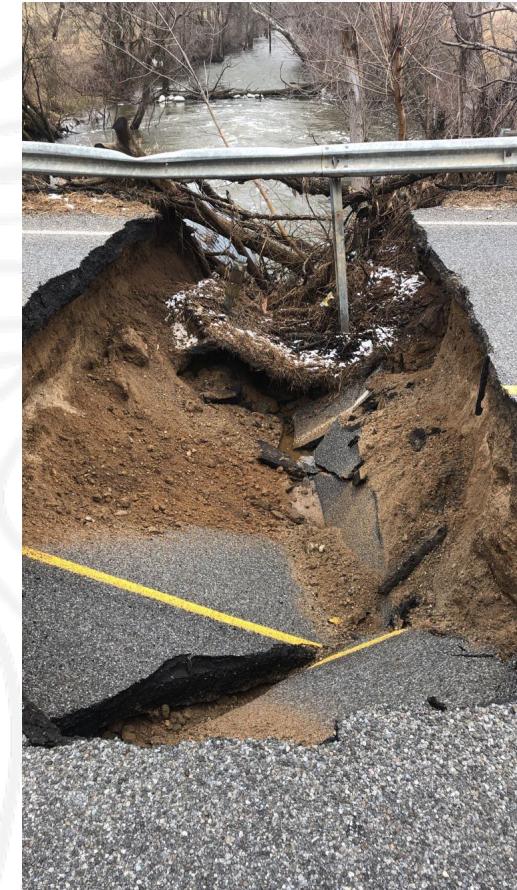
**Barry County Road Commission
Jake Welch, Managing Director**

**Kent County Road Commission
Wayne Harrall, Retired Deputy Director**

A multi-use **SOLUTION**



Differential Settlement
Green Lk Rd - 2024



Culvert Piping
N. Broadway Rd - 2020

GREEN LK RD - 2024



MOTOR

Poor subgrade soils...

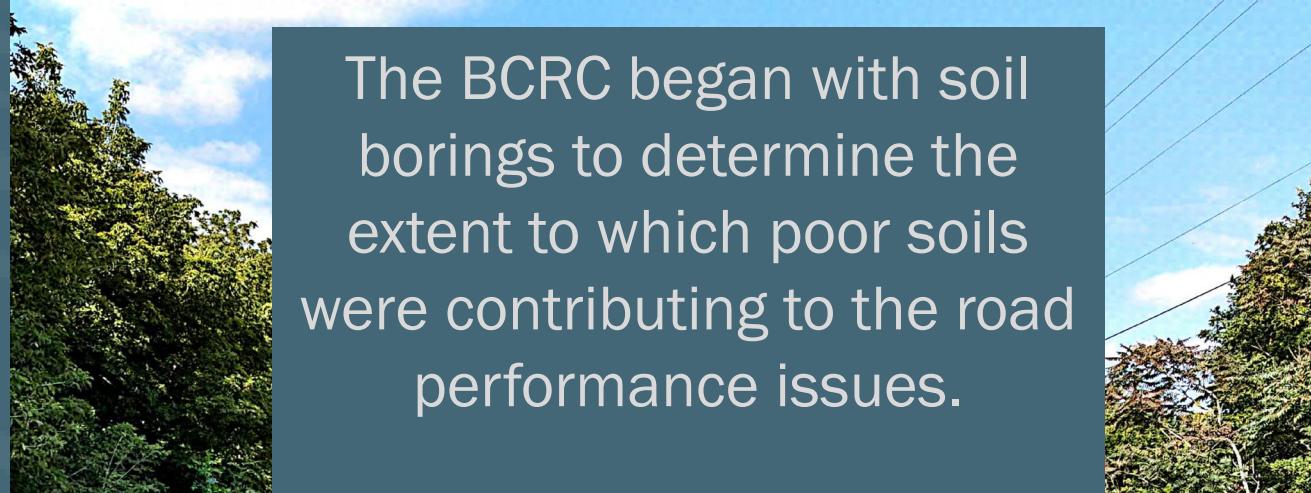
What's your solution?

TRUCKS

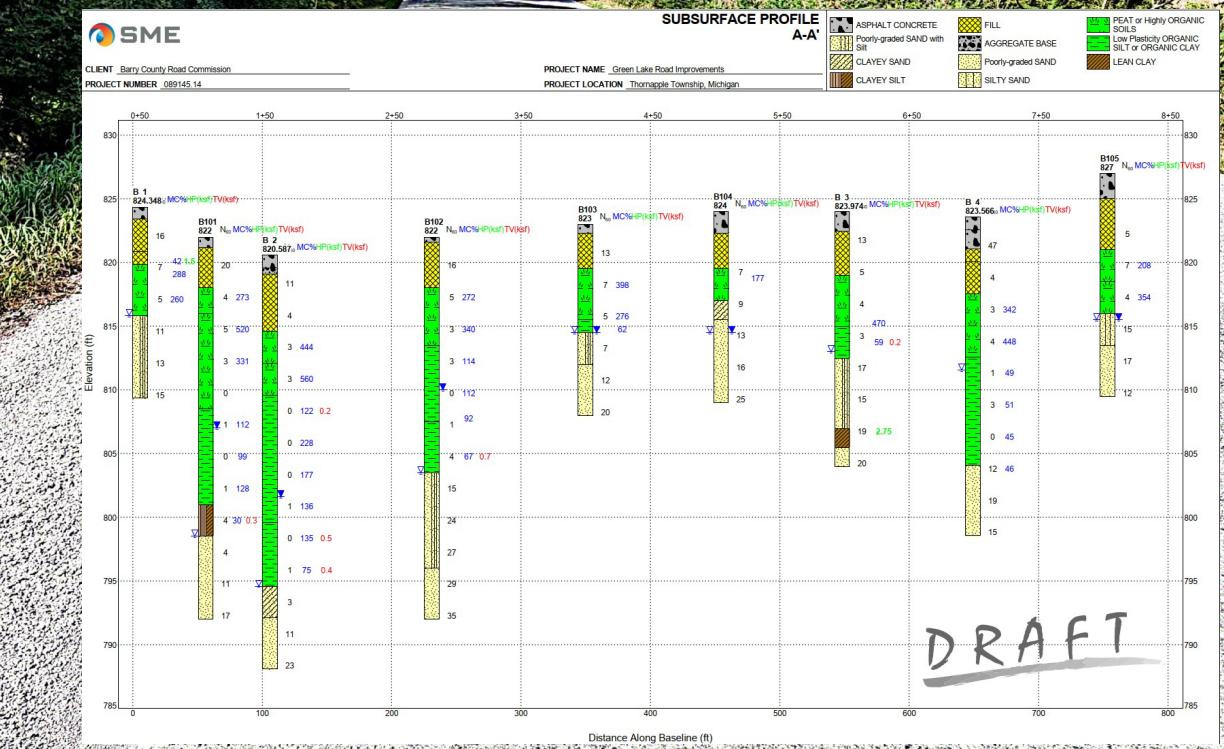
- Over-excavation?
- Surcharging?
- Dewatering?
- Repeated Patching?

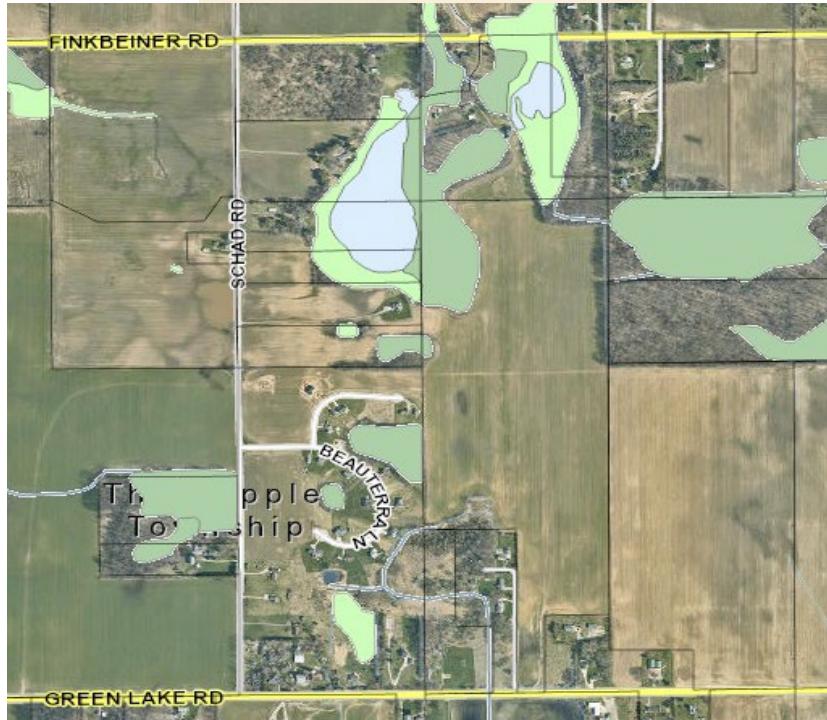


After an overlay in 2016, the road edge sheer cracked and settled from the quarter crown to the edge of pavement within 1 season, it became clear that a longer-term solution needed to be found.



The BCRC began with soil borings to determine the extent to which poor soils were contributing to the road performance issues.





In 2010 a contractor working on the reconstruction of Finkbeiner Rd sank an excavator in the new roadbed. This is the same vein running South to Green Lk Rd.



Peet & Muck existed down to 26' in the deepest boring.

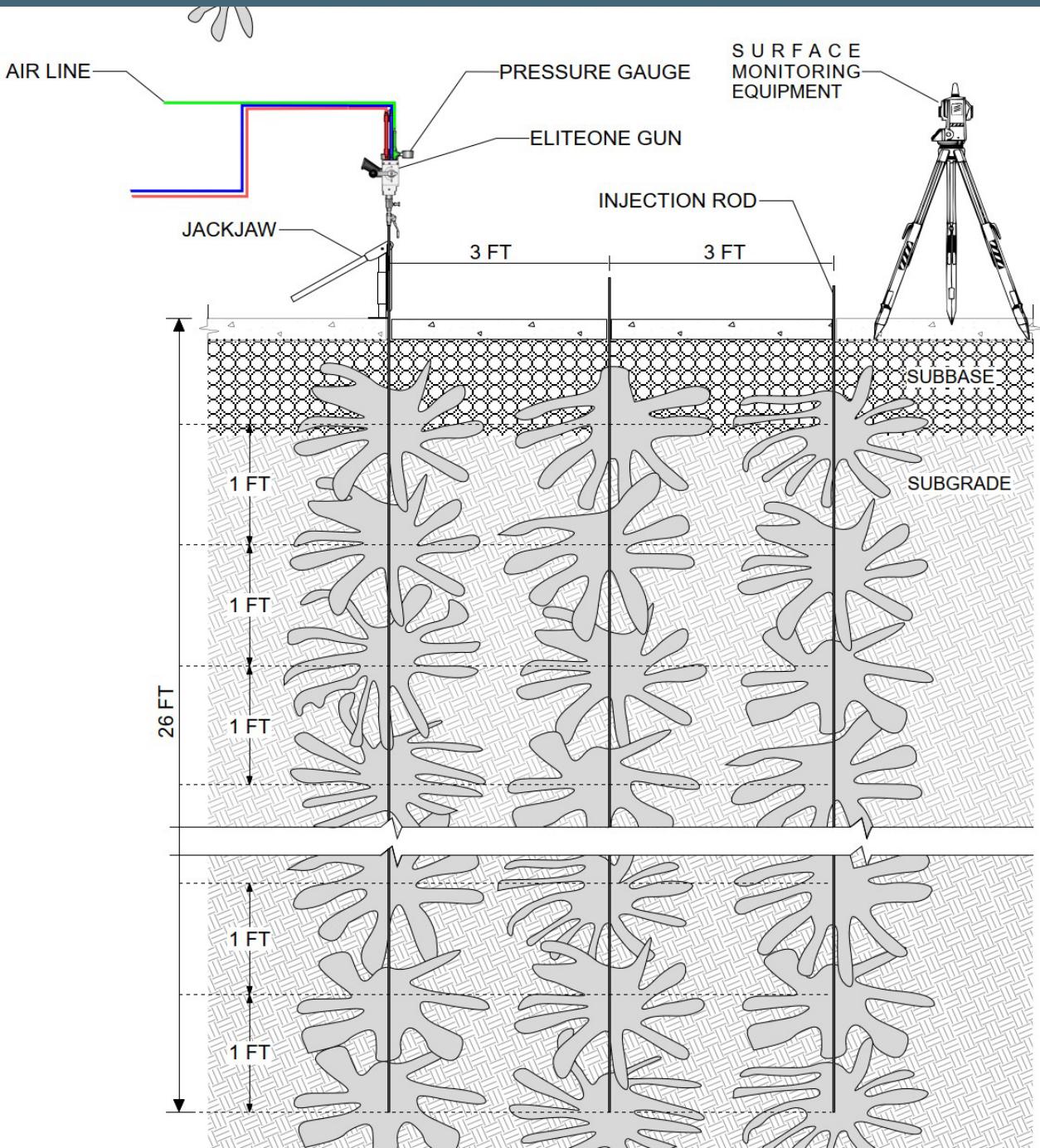
Options were gathered from the Geotech report:

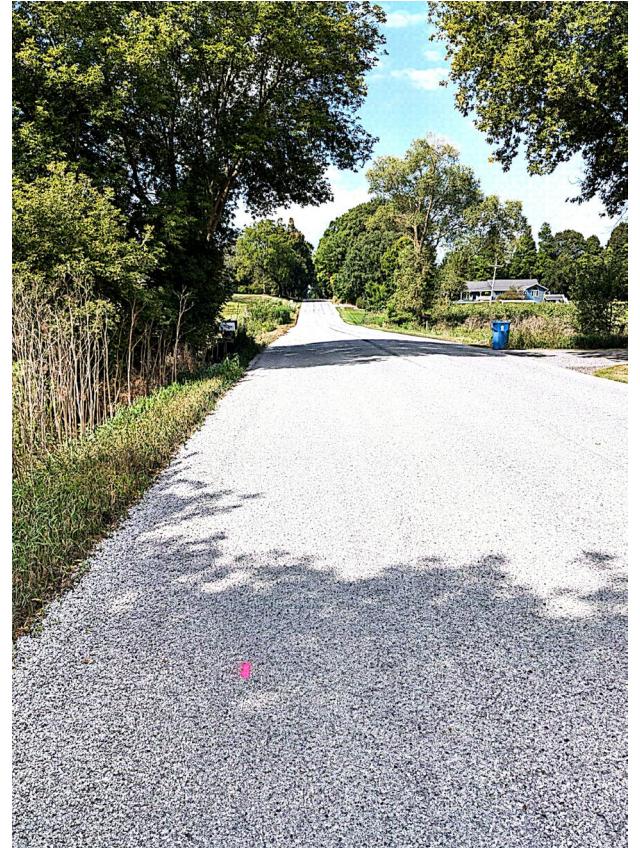
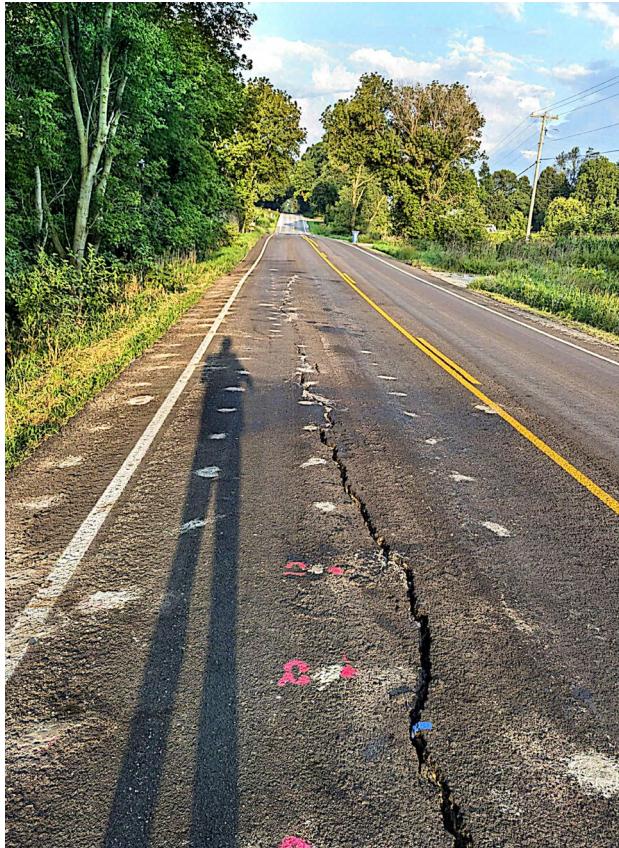


1. Dewater, excavate, & reinstall suitable material
\$ 1.5 million
2. Surcharge existing material with suitable soils
\$ 700k
3. Structural Foam Injection
\$ 100k



Foam injection involved a 3' x 3' grid pattern of 2" diameter holes drilled to the extents of the poor materials. As the foam pump reached resistance the pump was moved toward the surface 1' and the process was repeated to the surface.

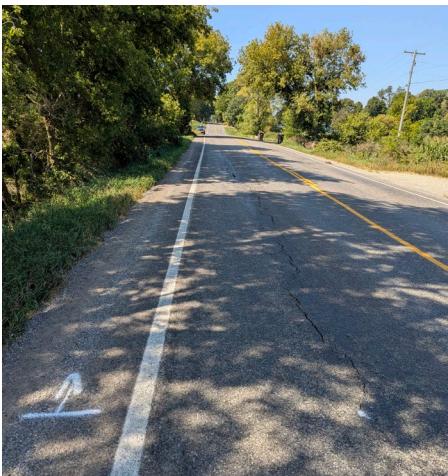




11,600 lbs of structural foam was injected into the roadbed and the Southern slope bank.

Where are we at **TODAY?**

The sheer cracks have re-opened as of the Fall of 2025. However, the differential settlement has not be observed. We plan to continue to monitor the location to determine if this is a feasible option in similar locations.

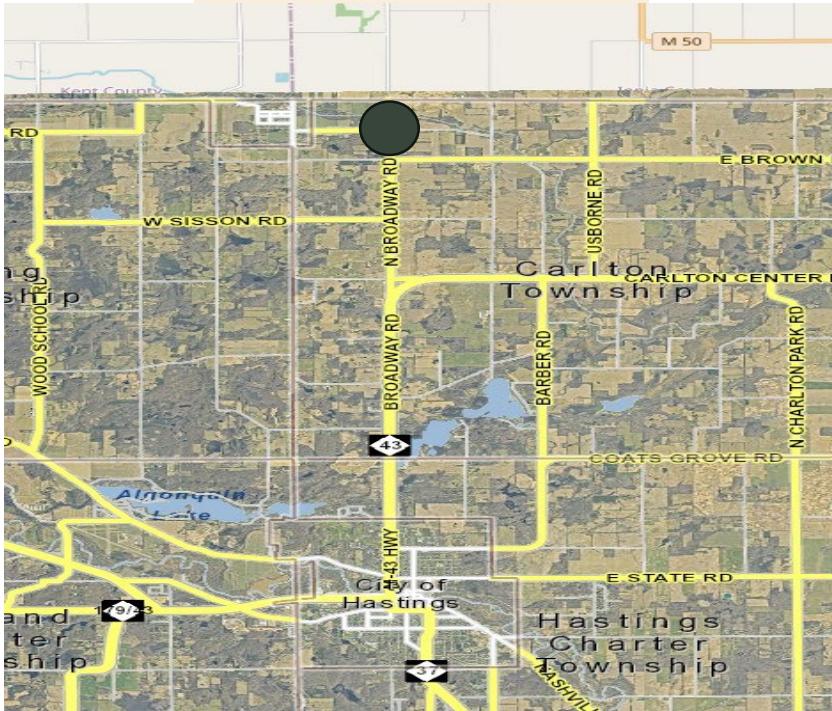


N. BROADWAY RD - 2020



Culvert Piping

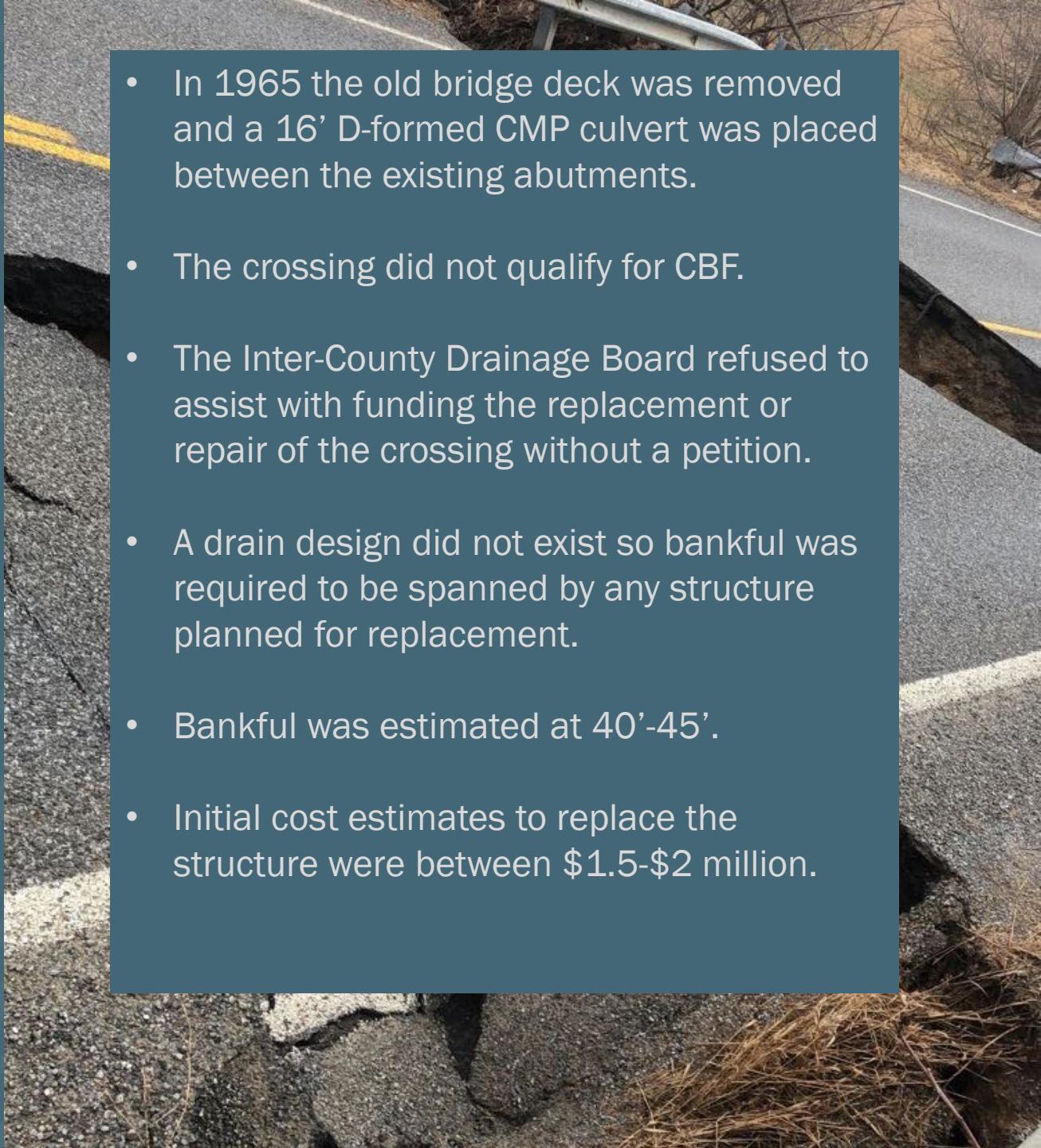
- 16' x 72' CMP Culvert
- Little Thornapple River
- Inter-county Drain
- Complete Failure in 2020



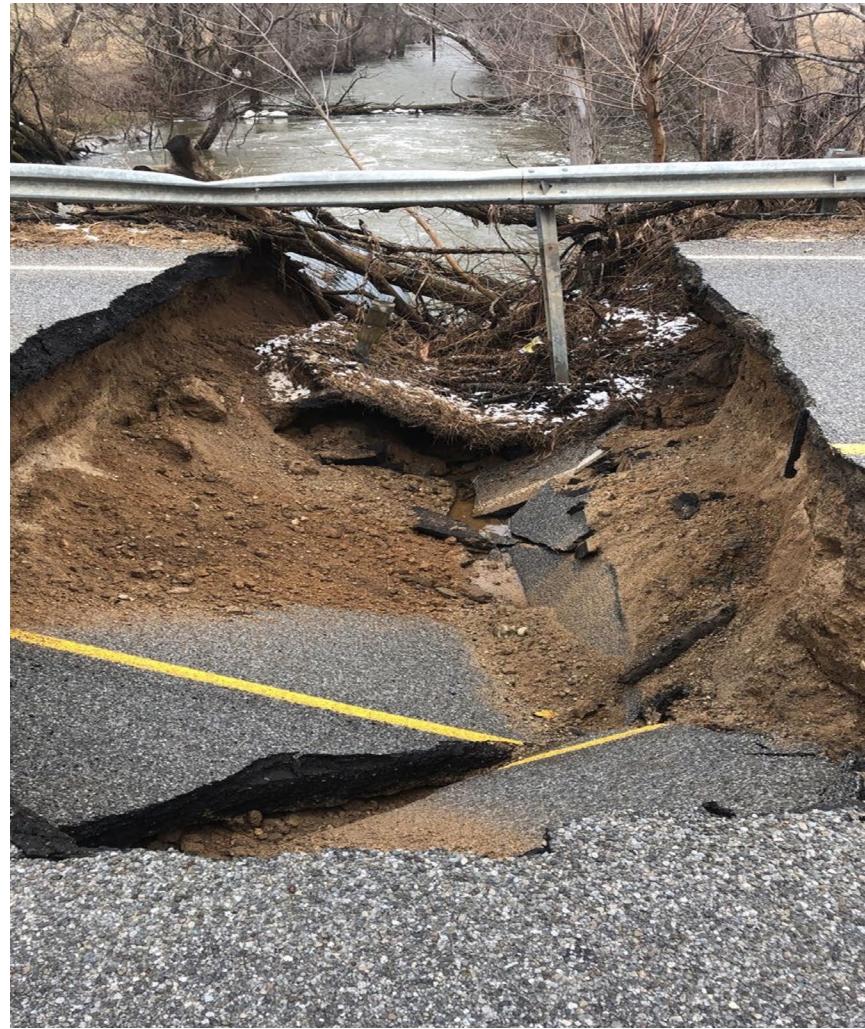
In the Spring of 2020, the BCRC had a culvert failure on N. Broadway Rd. This is a County primary linking Hastings to the East side of Grand Rapids.



- In 1965 the old bridge deck was removed and a 16' D-formed CMP culvert was placed between the existing abutments.
- The crossing did not qualify for CBF.
- The Inter-County Drainage Board refused to assist with funding the replacement or repair of the crossing without a petition.
- A drain design did not exist so bankful was required to be spanned by any structure planned for replacement.
- Bankful was estimated at 40'-45'.
- Initial cost estimates to replace the structure were between \$1.5-\$2 million.



An EGLE permit was granted for a repair project:



1. Repair the bottom of the pipe with a poured in-place concrete liner.
2. Sheet pile & rip rap the slopes.
3. Add an overflow culvert above the OHWM (Now NBI qualifying).
4. Foam injection stabilization through the culvert walls to fill any voids left from previous piping.



The repair project was completed for \$205,000

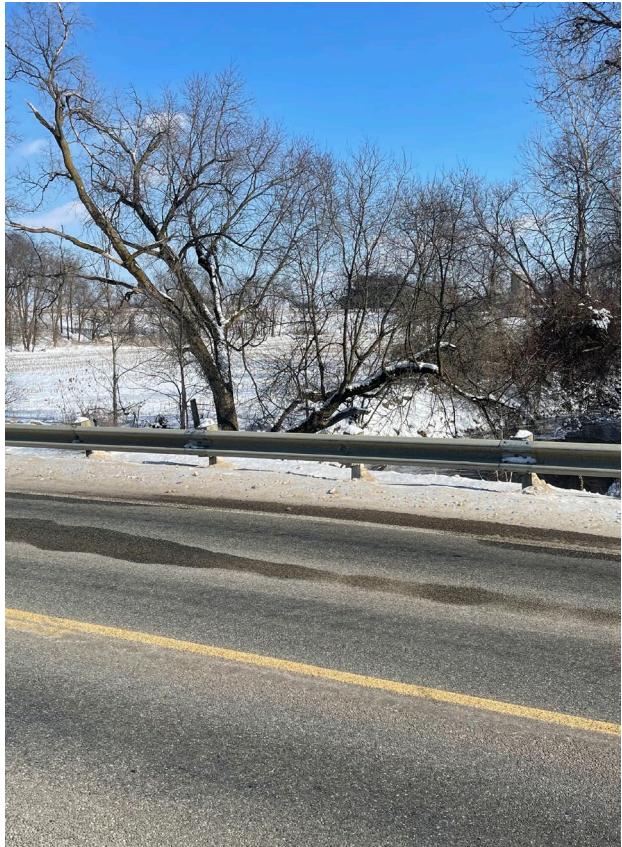


2,900 lbs of structural foam were injected into the ground surrounding the existing culvert.



Foam injection involved drilling small holes from the inside of the existing pipe outward. Foam was injected until it met resistance and the process was completed the entire length between the newly installed sheet pile wing walls.





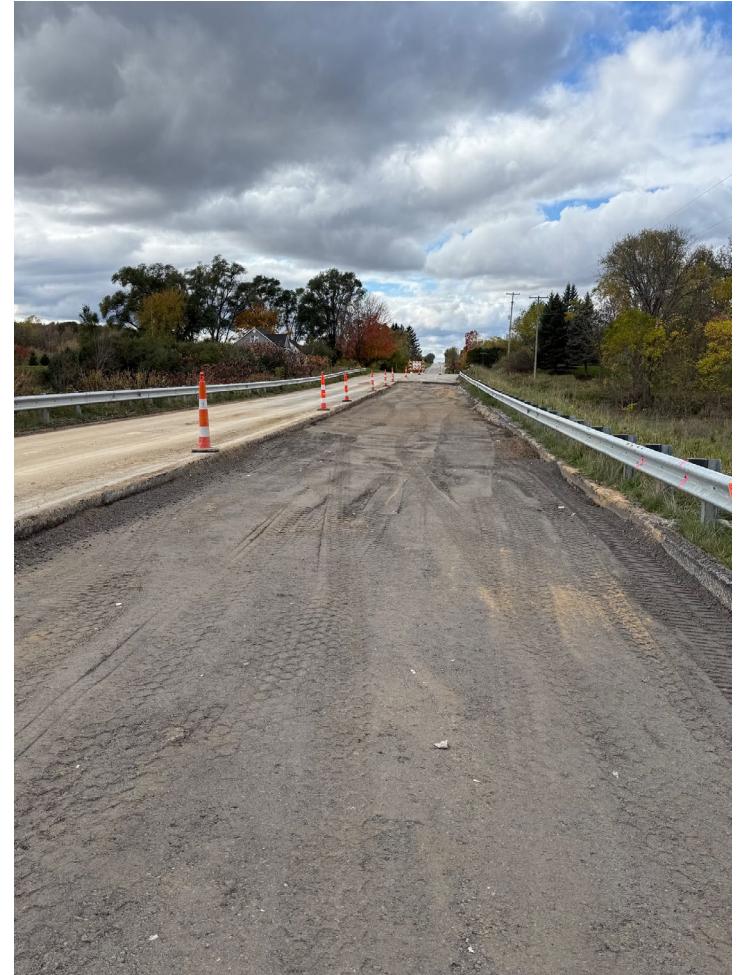
5 years post construction, the road and crossing have held up remarkably well with no additional signs of piping or road under-cutting.

100TH ST - 2023

Foam Block Integration

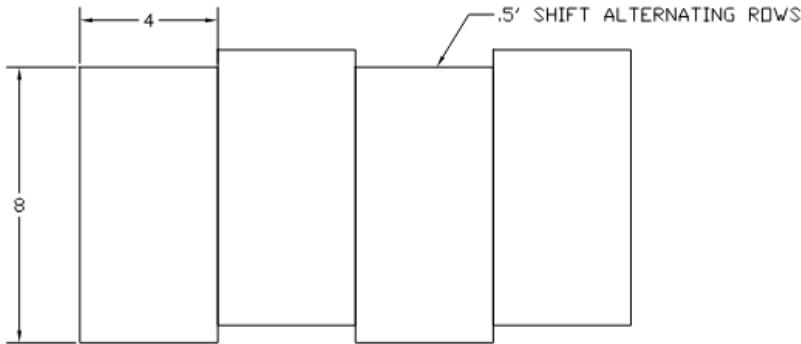


100th Street 2023

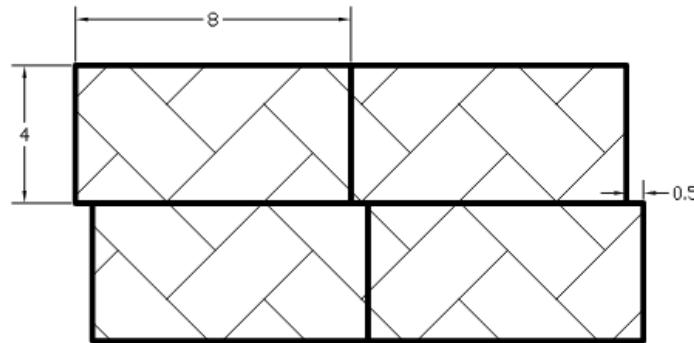


100th Street 2025

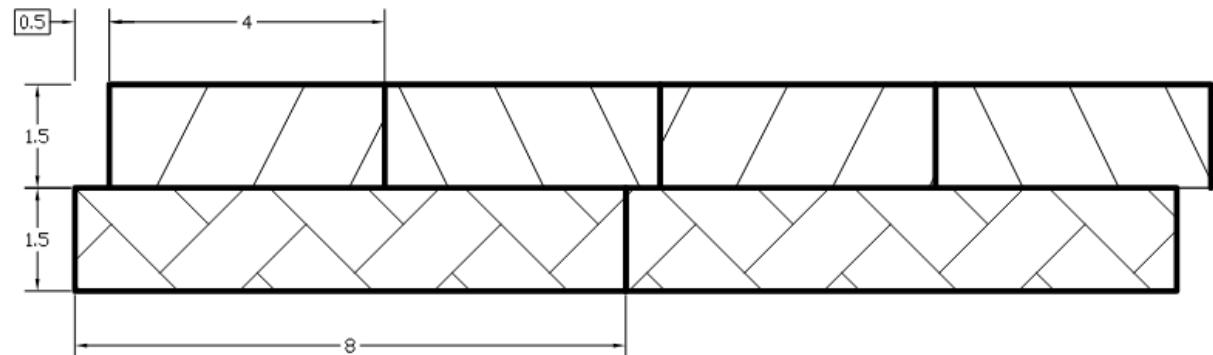
TOP ROW LAYOUT (SALVAGE BLOCKS)



BOTTOM ROW LAYOUT (NEW BLOCKS)



TYPICAL LAYOUT



QUESTIONS?



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